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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/648,237

08/27/2003

Chaur-Chin Yang

BHT-3183-53

3764

7590

09/21/2004

BRUCE H. TROXELL  
SUITE 1404  
5205 LEESBURG PIKE  
FALLS CHURCH, VA 22041

EXAMINER

ROSE, KIESHA L

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/648,237	<b>Applicant(s)</b> YANG ET AL.	
	<b>Examiner</b> Kiesha L. Rose	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/27/03</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

This Office Action is in response to the filing of the application.

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "113" and "140" have both been used to designate in Fig. 1 the same thing. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "130" has been used to designate both dummy die and package. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement

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sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 10, 11, 14-17, 19-20 and 23-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Giri et al. (U.S. Patent 6,765,152).

Giri discloses a chip module (Figs. 1-3) that contain a substrate (12) (printed circuit board) having a top surface, bottom surface and an opening passing through the top surface and the bottom surface, a dummy die (18) disposed on the bottom surface of the substrate corresponding to the opening, wherein the dummy die has a surface with a redistribution layer electrically connected with the substrate having flip chip pads and connecting pads and a chip flip chip (22) mounted on the surface of the dummy die inside the opening and electrically connected with the redistribution layer of the dummy

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die where the dummy die is larger than the flip chip, packaging (34) formed at the opening of the substrate, solder balls (14) formed on the bottom surface of the substrate by connection pads and a metal thermal conducting layer (layer on the underside of the dummy die where the other chips are formed).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6,7,12 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giri in view of Klein et al. (U.S. Publication 2004/0145051).

Giri discloses all the limitations except for stacked semiconductor package and pitch size for the flip chip pads. Whereas Klein discloses a semiconductor package (Fig. 9a) that contains a die (12) with a redistribution layer formed thereon with flip chip pads (22) and connecting pads where the flip chip pads have a smaller pitch than the connecting pads and a plurality of stacked semiconductor packages including a plurality of outer terminals (118) connecting the connection pads (52). The package is a stacked semiconductor package in order to form a system. (Page 7, Paragraph 96) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Giri by incorporating a stacked semiconductor package to create a system for electrical connection as taught by Klein. In regards to

claims 7 and 21, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the pitch of the flip chip being 150 $\mu$ m, since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (1980).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Giri in view of Kikuma et al. (U.S. Patent 6,621,169).

Giri discloses all the claimed limitations except for bonding wires connecting the redistribution layer to the substrate. Whereas Kikuma discloses a stacked semiconductor device (Fig. 25) that contains a substrate (108) and a chip with a redistribution layer (114) formed thereon where the redistribution layer and substrate are connected by bonding wires (116). The substrate and redistribution layer are connected by bonding wires to form an electrical connection between the two. (Column 17, lines 60-64) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Giri by incorporating the redistribution layer and substrate to be connected by bonding wires to form an electrical connection between the two as taught by Kikuma.

Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giri in view of Koopmans (U.S. Publications 2004/0035840).

Giri discloses all the limitations except for bumps bonding the connecting pads of the redistribution layer to the substrate. Whereas Koopmans discloses a flip chip (Fig. 1a) that contains a substrate (34) and a redistribution layer (21) with connecting pads (20) and bumps (26) that bond the connecting pads of the redistribution layer to the

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substrate. The bumps are formed between the connecting pads of the redistribution layer and the substrate to enable electrical interconnection to a package (redistribution layer and substrate). (Page 1, Paragraph 7) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Giri by incorporating bumps between the connecting pads of the redistribution layer and the substrate to enable electrical interconnection to a package (redistribution layer and substrate) as taught by Koopmans.

Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giri in view of Higgins III (U.S. Patent 5,583,377).

Giri discloses all the claimed limitations except for the substrate to have a stair configuration. Whereas Higgins discloses a semiconductor device (Fig. 2) that contains a substrate (42) with a stair configuration (44) and a chip (13) mounted in the opening of the substrate. The substrate is formed with a stair configuration to help with the manufacturing cost and form a lower profile device. (Column 5, lines 18-20) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Giri by incorporating the substrate to have a stair configuration to help with manufacturing cost and make a lower profile device as taught by Higgins.

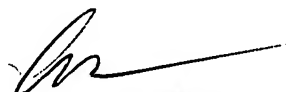
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on M-F 8:30-6:00 off 2nd Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
KLR

  
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